
INVESTIGATION OF RuO₂-IrO₂-SnO₂ THIN FILM EVOLUTION A thermoanalytical and spectroscopic study

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The thermal evolution process of RuO₂-IrO₂-SnO₂ mixed oxide thin films of varying noble metal contents has been investigated under in situ conditions by thermogravimetry-mass spectrometry (TG-MS), infrared emission spectroscopy (IR) and cyclic voltammetry (CV). The gel-like films prepared from aqueous solutions of the precursor compounds RuOHCl₃, H₂IrCl₆ and Sn(OH)₂(CH₃COO)_{2-x}Cl_x on titanium metal support were heated in an atmosphere containing 20% O₂ and 80% Ar up to 600°C. Chlorine evolution takes place in a single step between 320 and 500°C accompanied with the decomposition of the acetate ligand. The decomposition of surface species formed like carbonyls, carboxylates and carbonates occurs in two stages between 200 and 500°C. The temperature of chlorine evolution and that of the final film formation increases with the increase of the iridium content in the films. The anodic peak charge shows a maximum value at 18% iridium content.

Keywords: electrocatalysis, IrO₂, RuO₂, SnO₂, sol-gel process, thin films
